White Chuck Watershed Analysis

Chapter 1- Purpose of Analysis

Table of Contents

Chapter 1 Figures and Tables

Introduction

The White Chuck Watershed Analysis (WA) was conducted to meet the watershed analysis requirements established by the Northwest Forest Plan *(Record of Decision* [ROD] *for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl* (USDA, USDI 1994a). This study analyzes the ecosystem at the watershed scale, presenting information to help guide future resource management decisions. The analysis process followed is outlined in: *Ecosystem Analysis at the Watershed Scale: Federal Guide for Watershed Analysis Version 2.2* (USDA, USDI 1995). The analysis was conducted using the best available information on the White Chuck watershed. The analysis will be revised and updated as appropriate, to consider new information, changing conditions, or potential effects associated with long-term management issues and/or needed actions.

This analysis is not a decision document. Any projects proposed in this area will still require additional analysis as required by the National Environmental Policy Act (NEPA).

Watershed Highlights

The majority (71%) of the White Chuck watershed is congressionally designated as wilderness. The White Chuck watershed supports relatively intact terrestrial and aquatic ecosystems. Maintenance of the relatively intact systems and restoration of impacted lands in the analysis area assume greater importance as development in the Skagit Basin and Puget Sound Region proceeds.

The White Chuck is a tributary to the Sauk River, the largest tributary to the Skagit River, which in turn, is the largest drainage in the Puget Sound Region of the Western Washington Cascades Province. The White Chuck watershed lies west of Glacier Peak, and flows into the Sauk River. Increasingly intensive lowland conversion, development and resource extraction in the Puget Sound and the Skagit Basin have resulted in reduced amounts and diversity of available wildlife and fisheries habitats. These changes translate to increasing pressures on the headwater tributaries, such as the White Chuck watershed to function as refuges.

Analysis Area Size and Ownership

The White Chuck Watershed is located on the Baker-Snoqualmie National Forest (MBS), Pacific Northwest Region Six. The entire watershed is comprised of National Forest Systems land located in Snohomish County, Washington State. It is administered by the Darrington Ranger District.

Table 1 Analysis Area Acreage by Subwatershed

Subwatershed Number	Acres
171100060105	24,574
171100060106	29,935
Analysis Area Total:	**54,509**

Figure 1 Western Washington Cascades Province Map

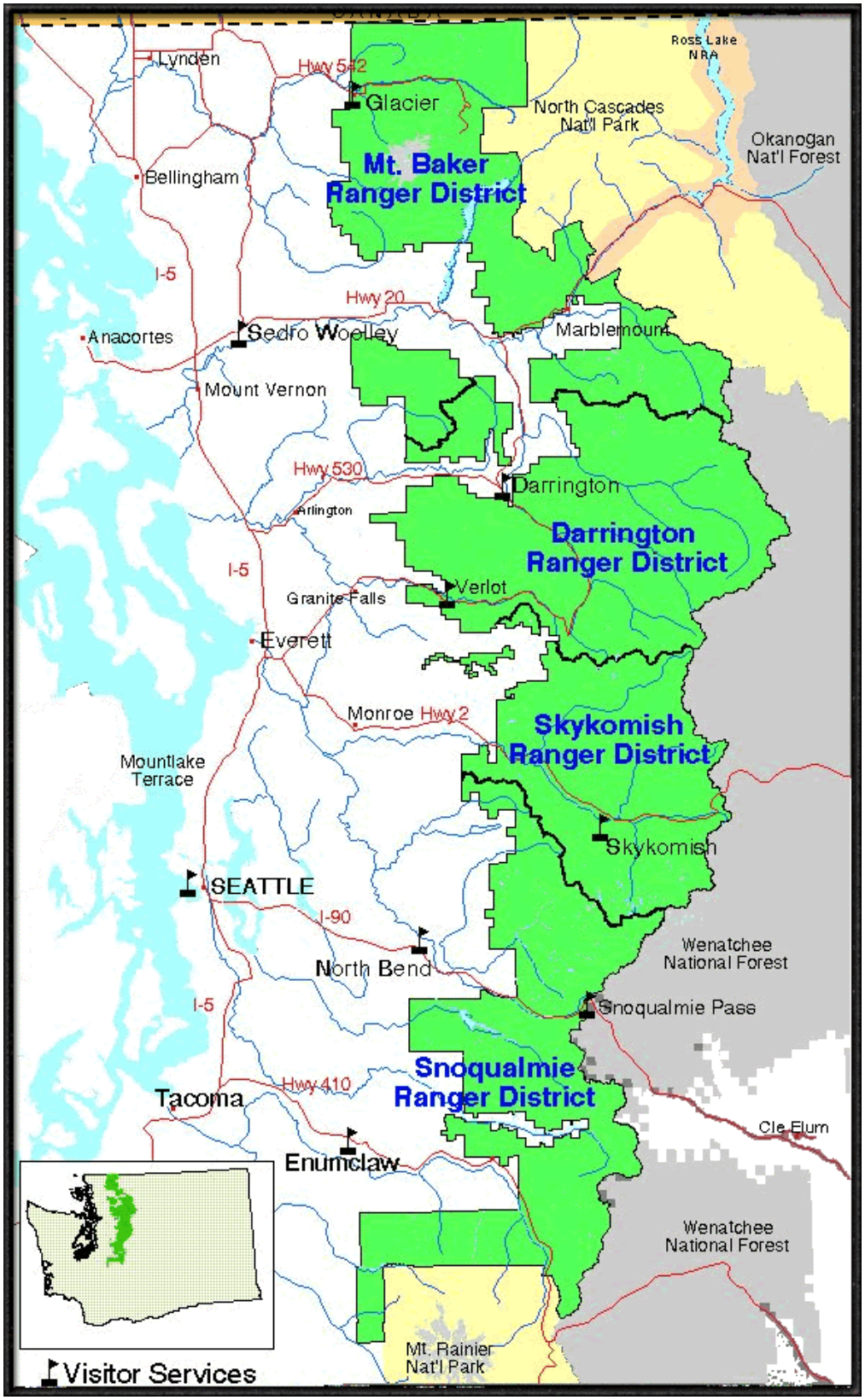


Figure 2 Vicinity Map

Western Washington
Province Map

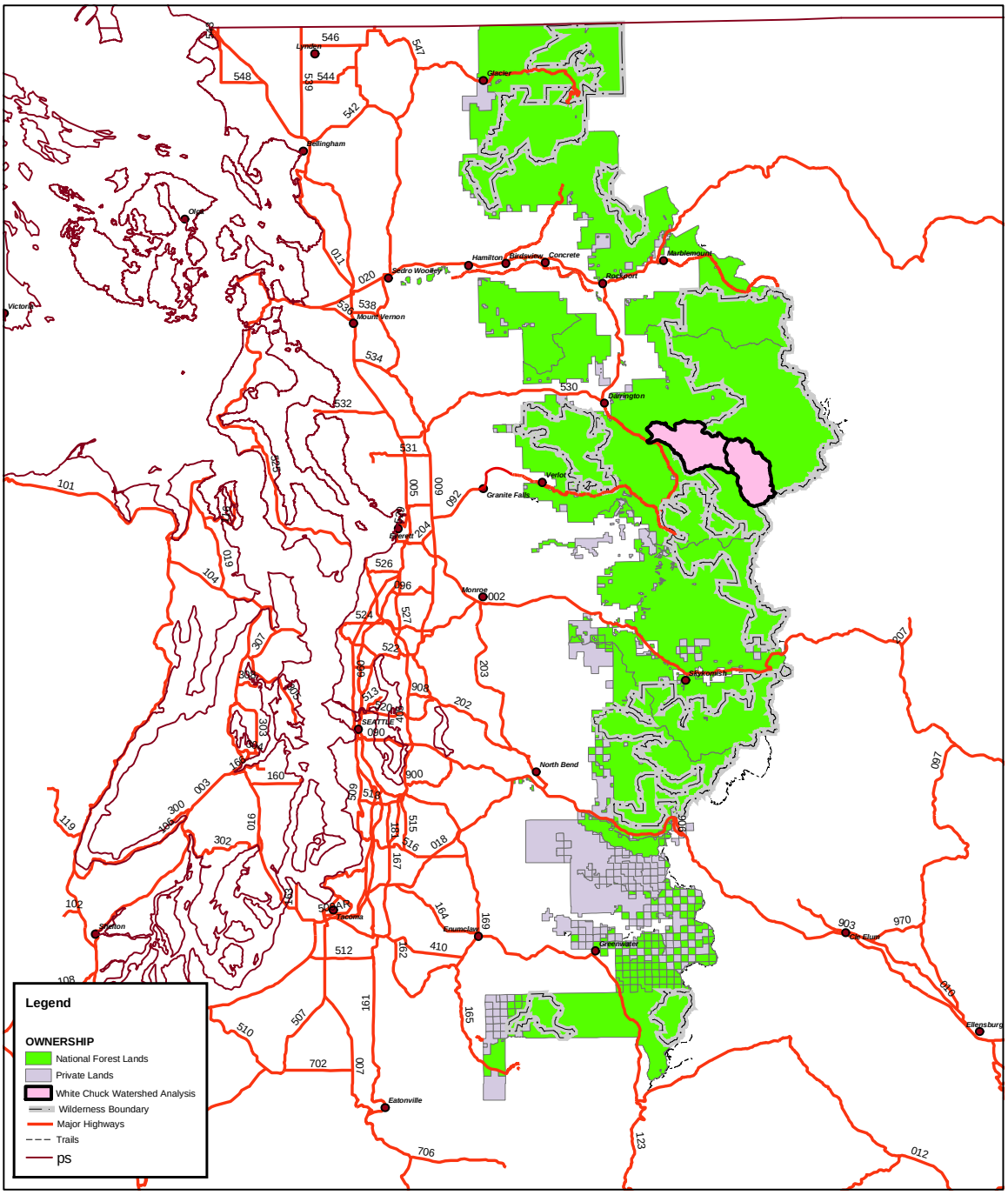
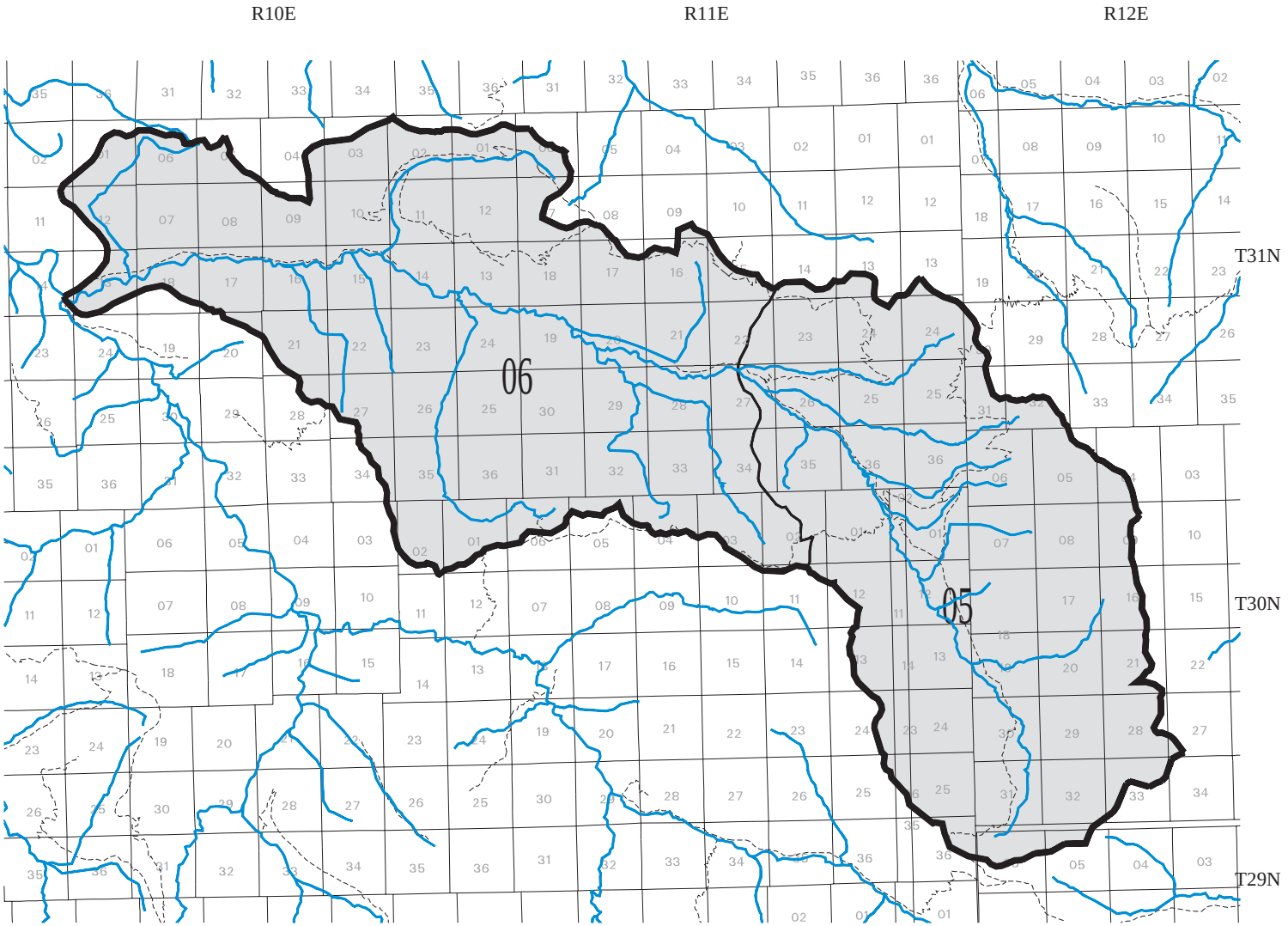


Figure 3 Watershed and Subwatersheds



Sixth Field Watersheds

Management Direction

The Forest Plan

The Mt. Baker-Snoqualmie National Forest Land and Resource Management Plan (Forest Plan), as amended,[1] provides management direction for the National Forest System lands (NFS) within the White Chuck WA area. Direction is provided in the form of goals and objectives, and Forest-wide and Management Area standards and guidelines (S&Gs).

The 1994 ROD, a major amendment to the Plan, incorporates seven land allocations, which amend the allocations described in the 1990 Forest Plan. (One allocation—Managed Late-Successional Areas—does not occur on the MBS.) There is considerable overlap among some allocations, and more than one set of standards and guidelines may apply (such as Riparian Reserve requirements within a Late Successional Reserve). In addition, where the standards and guidelines of the 1990 Forest Plan are more restrictive or provide greater benefits to late-successional forest-related species than do those of the 1994 ROD, the existing S&Gs apply.[2] For additional detail, refer to USDA Forest Service, USDI BLM 1994, particularly the ROD pages 8 and 12.

The 1994 amendment also includes additional forest-wide standards and guidelines, and an Aquatic Conservation Strategy with four components—riparian reserves, key watersheds, watershed analysis, and watershed restoration—that are designed to help improve the health of the aquatic ecosystem.

Land Allocations Within the White Chuck Analysis Area

The following are land allocations found within the White Chuck WA area:

Congressionally Reserved Areas: Reserved by Act of Congress, these areas include portions of the Glacier Peak Wilderness (Management Area (MA) 10) and the Skagit Wild and Scenic River. Over 70 percent of the White Chuck Watershed analysis area falls within wilderness.

[1] *Major amendments to the 1990 Plan include: April 1994,* Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl, and Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl (***1994 ROD*** *or* ***Northwest Forest Plan****),; and January 2001* Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines ***(2001 ROD).***

[2] For example, Many acres on the MBS had been allocated to primitive (1A) or semi-primitive (1B) non-motorized dispersed recreation—with no scheduled timber harvest or road construction permitted. Where these areas now fall within the network of Late Successional Reserves, they have been mapped 1A/LSR or 1B/LSR. The standards and guidelines for both allocations apply, with the most restrictive taking precedent.

Administratively Withdrawn Areas: These include recreation, certain wildlife emphases, and other allocations from the 1990 Plan that are not scheduled for timber harvest. Included are: MA 1B, Semi-primitive, Non-motorized Dispersed Recreation; MA 15, Mountain Goat Habitat; MA 12 Habitat for Mature and Old-Growth Wildlife[3]; and a few acres of MA 19 Mountain Hemlock Zone.[4]

Riparian Reserves: This allocation, an Aquatic Conservation Strategy component, includes areas along all streams, wetlands, ponds, lakes, and unstable or potentially unstable areas. Riparian Reserves are mapped overlaying all other allocations. With very specific exceptions (see 1994 ROD, page C-32), timber harvest is generally prohibited.

Matrix. The matrix includes the federal land not in the other allocations. It is the area in which scheduled timber harvest may occur, both full and partial yield. Matrix may also include non-forested areas and lands that are technically unsuited for timber harvest. In the White Chuck Analysis area, matrix allocations include: MA 17, Timber Emphasis; MA 1D, Roaded Natural Dispersed Recreation; MA 2A and 2B, Scenic Viewshed, Foreground and Middleground; and MA 5A, Recommended Wild and Scenic River, Recreation River.

Late Successional Old Growth (LSOG): These areas contain late successional and old growth habitat, located within the Marbled Murrelet Zone 1.[5] LSOGs are managed under Late Successional Reserve standards and guidelines. The Late Successional Reserves (LSR), in combination with other allocations and standards and guidelines, will maintain a functional, interactive late-successional and old growth forest ecosystem, designed to serve as habitat for late-successional and old-growth related species. Refer to Table 2 for land allocation acreage and Figure 4 Merged Land Allocations

Tier 1 Key Watershed

As noted above, Key Watersheds are one component of the Aquatic Conservation Strategy. A system of Key Watersheds that serve as refugia is considered to be crucial for maintaining and recovering habitat for at-risk stocks of anadromous salmonids and resident fish species. Key Watersheds overlay the other land allocations (including wilderness). The entire White Chuck River drainage is located within a Tier 1 Key Watershed. These contribute directly to the conservation of at-risk anadromous salmonids, bull trout, and resident fish species. Refer to the 1994 ROD, pages B-18 to –19, and C-7 for more information, and additional standards and guidelines.

[3] *Pine marten and pileated woodpecker.*

[4] *This MA is designed to be a study area to test reforestation within the mountain hemlock zone. No study has yet been prepared.*

[5] *In Washington State, Zone 1 extends approximately 40 miles inland.*

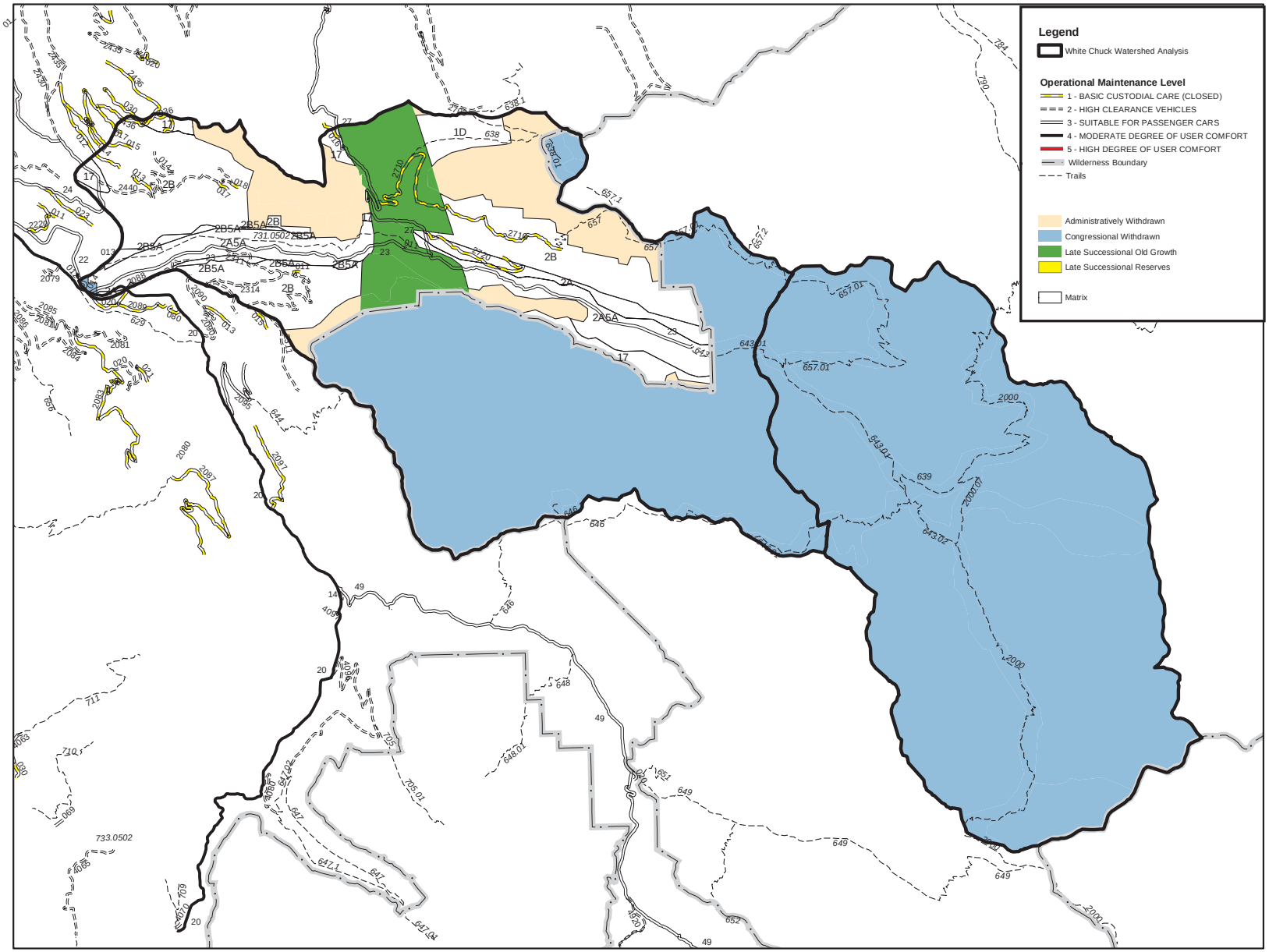
Other Lands

Roadless Areas: The White Chuck Watershed includes a number of roadless area parcels, inventoried as part of the national Roadless Area Review and Evaluation (RARE II) process in 1979. Several parcels are over 1,000 acres in size; others are smaller. All were excluded from wilderness designation in the Washington State Wilderness Act of 1984 (P.L. 98-339).Figure 5 on page 10 shows the roadless areas. See Appendix C, 1990 Forest Plan (USDA 1990) for additional descriptions.

Table 2 Land Allocation Acres

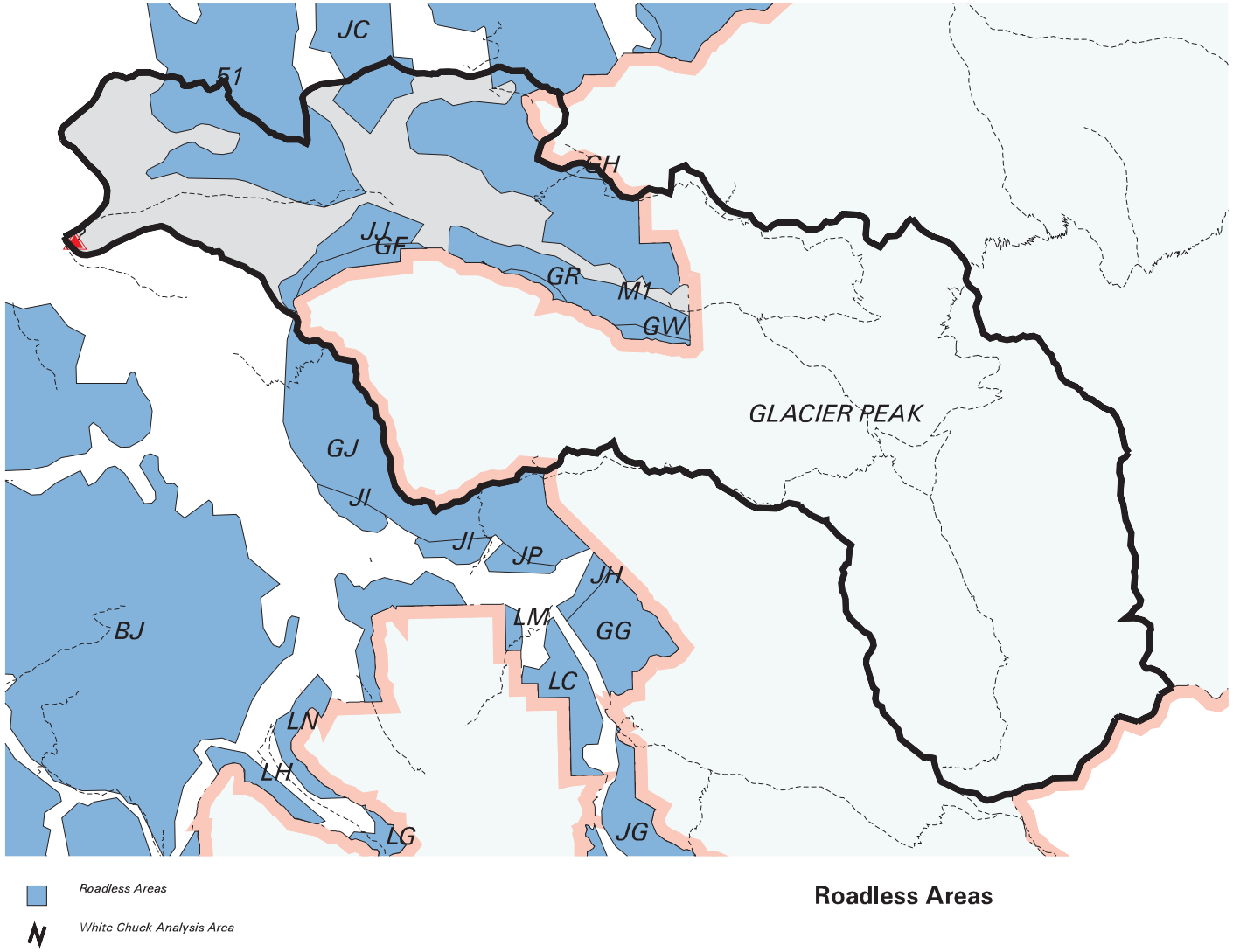
1994 Rod Allocation	1990 Plan Management Area	Acres	Description	% of WA
Congressionally Withdrawn	MA 10 (A-D)	38,867	Wilderness	71%
	MA 6	33	Skagit Wild and Scenic River	-
Administratively Withdrawn	MA 1B	3,662	Dispersed Recreation, Semi-Primitive Non-motorized (overlap with MA 5A = 293 acres; overlap with LSOG = 277 acres)	7%
	MA 15	459	Mountain Goat Habitat (overlap with MA 5A = 59 acres; overlap with LSOG = 37 acres)	1%
	MA 12	54	Mature & Old-Growth Habitat, Pine Marten & Pileated Woodpecker	-
	MA 19	14	Mountain Hemlock Zone	-
LSOG		2,021	Late Successional/Old Growth (overlap with MA 5A = 459 acres)	4%
Matrix	MA 17	672	Timber Management Emphasis	1%
	MA 1D	471	Dispersed Recreation, Roaded Natural	1%
	MA 2A	2,855	Scenic Viewshed, Foreground (overlap with MA 5A = 2,316 acres)	5%
	MA 2B	5,393	Scenic Viewshed, Middleground (overlap with MA 5A = 231 acres)	10%
TOTAL		54,509		
Overlapping Land Allocations				
LSOG Total		2,335	Includes overlaps from above allocations.	
Matrix	MA 5A Total	3,358	Recommended Wild & Scenic River, Recreation River; includes overlaps from above allocations.	
Riparian Reserve		21,947	Overlaps all allocations	40.3%

Figure 4 Merged Land Allocations



Merged Land Allocations

Figure 5 Roadless Areas



Watershed Characterization

Aquatic Habitat and Fish Species

Essential Fish Habitat for Chinook and coho is present in the White Chuck, but pink salmon Essential Fish Habitat is not considered present. Chinook spawn up to River Mile (RM) 10.4 on the White Chuck River and are Threatened under the Endangered Species Act as are native char (Bull Trout and Dolly Varden), which utilize up to RM 19. Coho in the White Chuck are part of the Skagit coho stock and have been found as far as Owl Creek (RM 9.8) and are a Candidate species. Other fish include steelhead, pink salmon, sockeye salmon, and sea-run cutthroat. Resident fish include cutthroat, rainbow, char, mountain whitefish and sculpin. Most of the named lakes have been stocked with cutthroat and rainbow the dominant species used.

The primary fish stocks of concern are spring Chinook and bull trout. Of the 24 subpopulation and habitat diagnostic indicators, only one indicator (road density and location) was identified as "functioning at-risk" in the White Chuck.

Water Quality

The water quality has not been tested in any rigorous way, but the low level of human-caused disturbance or pollution in the watershed suggests a decreased potential for water quality degradation. There is no evidence that stream temperature standards are violated in the White Chuck River. However, there is some concern that conditions for bull trout may be impaired in some years. There are small areas in the Riparian Reserves where later seral vegetation is lacking. Overall, these areas should not impair wood recruitment, but may represent small heat loads that contribute to higher stream temperatures. Turbidity in the White Chuck is naturally high because of glaciers in the headwaters, with the highest turbidity in the summer when the glaciers are actively melting. Fecal coliform contamination of surface waters is a concern at heavily used sites in Boulder Basin, Lake Byrne, and Kennedy Hot Springs. Road drainage problems have been identified on Forest Service Road 23 and 27 by the Department of Ecology. The White Chuck River, however, is not listed on the 303(d) list of impaired water bodies.

Hillslope Processes

The geologic bedrock material is very characteristic of the North Cascades complex structure. Much of the original bedrock material originated from ocean floor sediments, which have been altered to various forms of metamorphic bedrock material. Since the last ice age, (approximately 15,000 years ago) Glacier Peak has produced some of the largest and most explosive eruptions in the state. Pyroclastic flows and mudflows (lahars) have also originated from Glacier Peak. Numerous faults exist within the watershed, particularly in the Lower White Chuck subwatershed.

Soil productivity is quite variable. Approximately 36 percent of the watershed consists of rock outcrop and talus slopes, which are mainly located in the upper steep slopes. Soil development and productivity is much higher within the valley bottoms and lower toe slopes. Approximately 22 percent of the watershed is considered to have a high potential for mass wasting activity, 46 percent moderate risk, and 32 percent having a low risk rating.

Hydrology

The White Chuck River is approximately 35 miles in length, flowing in a northwest direction and joining the Sauk River at RM 31.9. The drainage density is relatively high, 660 miles of stream in 85.2 square miles, or an average density of 7.75 miles per square mile.

The climate in the White Chuck River Watershed is characterized by winter snow and spring and fall rain and typically dry in July and August**.** The valley bottom from Owl and Camp Creeks downstream lies within the transitional rain on snow zone. Snow persists well into June and July at the higher elevations. Annual precipitation varies from 82 inches near the mouth of the White Chuck River to 131 inches at White Mountain with an average of 101 inches.

The major storms that produce flooding are associated with freezing levels up to 7,000 feet elevation. This makes it probable that there is rain and snowmelt in both the snow dominated (21%) and the rain-on-snow (10%) zones that contribute to flooding. The White Chuck River Watershed has a relatively low amount of these zones; and therefore, is not as prone to rain on snow flooding, as are other watersheds. The low vegetative disturbance level in the area suggests that current management has little effect on the rain-on-snow runoff.

The majority of the mature streamside vegetation is along the smaller streams (Classes 3 and 4). The fish bearing streams (Classes 1 and 2) have mature riparian vegetation along about 40 percent of the stream miles. A relatively small portion of the stream miles (14%) has erosive soils and most of those miles have mature vegetation present. There are areas of instability along steep inner gorges where the side slopes are kept over steepened by erosion of the toe slopes. This is predominant along the mainstem White Chuck and tributaries between Kennedy and Crystal Creeks.

Vegetation

The White Chuck watershed exists in one of the drier parts of an otherwise wet ranger district. Between the west end of the watershed and Puget Sound lie a series of peaks and ridges that wring much of the moisture from storm systems before they arrive. The relative dryness causes the primary vegetation zone boundaries to shift uphill compared with other wetter parts of the District. Conversely, the silver fir zone dips to a relatively lower elevation in the watershed along some streams where cold air drains. Due to the amount of high elevation in the analysis area, a large amount of acreage is also non-forested. There are six vegetation zones in the White Chuck watershed. Many watersheds have fewer than this number. Because the drainage is bordered on the east by Glacier Peak, and by lesser peaks on the north and south, an extreme range of elevations and, therefore, vegetation zones are present.

The primary influences on the area's vegetation are fire, topography, climate, and past harvest. Previous harvesting occurred at the west end of the analysis area, in the Crystal Creek drainage, and north of the Crystal Creek confluence. The most recent clear cuts date to the 1990s. Analysis of the seral stages shows that each vegetation zone is within or very near its natural range of variability.

There are 12 Sensitive or Survey and Manage plant species in the analysis area documented from 40 separate sites. This is a high number for a small analysis area, and is partly a function of abundant suitable habitat and survey effort. Two noxious weeds are known to be in the analysis area. Orange hawkweed was found along the White Chuck Road, and Japanese knotweed was found at the end of a spur road at the west end of the drainage.

Wildlife

The White Chuck Watershed supports habitat for a variety of wildlife species typically found in the North Cascades. With 71 percent of the watershed in wilderness, the area is important for wildlife species with large home ranges. This supports habitat for wildlife species such as the grizzly bear, gray wolf, wolverine, marten, and spotted owl. The White Chuck analysis area is within the North Cascades Recovery Zone for the grizzly bear, and the Meadow Mountain area was one of the last documented areas of grizzly bear and human encounters in the 1940s.

There are no Late Successional Reserve (LSR) allocations in the analysis area outside of the 300-acre Late Successional Old Growth Area (LSOG) in the Rat Trap Pass area. This LSOG provides connecting habitat (potentially suitable old growth) between the Suiattle River LSR and the wilderness acres in the White Chuck River drainage. The wilderness provides large blocks of old growth forests with suitable habitat for spotted owl, and potentially marbled murrelet. Due to the distance of the wilderness areas inland from saltwater, murrelets use may not be as great as other areas closer to saltwater. The 300-acre LSOG in Rat Trap Pass is considered part of the critical habitat designations for marbled murrelets since this LSOG is within the 40-50 mile range of the marbled murrelet from salt water. There is Critical Spotted Owl Habitat within the Crystal Creek area.

The White Chuck watershed includes a dynamic river valley with associated riparian habitat for beaver and many songbirds, and upper elevation areas of parkland and unique habitats. The steep, rocky cliff areas on White Chuck Mountain, Pugh Mountain, and Glacier Peak are habitat for mountain goats, a Forest Management Indicator Species (MIS).

Human Use

The White Chuck River was the ancestral territory of the present day Sauk-Suiattle Tribe. Salmon fishing may have occurred at the mouth of the White Chuck and parts of the watershed were used for plant gathering and hunting.

Timber harvesting in the watershed started in the late 1920s using railroads with increasing activity through the 1950s using truck roads. Since the 1950s, the harvest unit size has decreased and units were mores dispersed. The predominant method of harvesting was clear-cutting with the total acres estimated at 4,940, which is about 9.1% of the watershed.

Within the White Chuck watershed there are approximately 55 miles of existing road. The maintenance level for about 22 miles of road is listed as Level 1 (closed – in storage), about 17 miles is Level 2 (open – high clearance vehicles) and about 16 miles is Level 3 (open – passenger cars).

Recreational use began as early as 1927 when a Seattle Mountaineers group climbed Glacier Peak. Seventy-one percent of the watershed is located within the Glacier Peak Wilderness. Recreation use within the White Chuck Watershed has steadily increased throughout the years. The White Chuck Trail receives the heaviest use with about 6,000 user days per year. Climbing Glacier Peak accounts for about 45 percent of the use, Kennedy Hot Springs 27 percent, and hiking the Pacific Crest Trail, 19 percent. The White Chuck watershed contains 15.4 miles of the Pacific Crest Trail, a National Scenic Trail.

The watershed contains 62.5 miles of trails with 75 percent designated as more difficult. Most of the trails are designated as stock trails and are in the wilderness. There are several dispersed camping sites, the White Chuck Boat Launch located at the confluence with the Sauk River, and the White Chuck Overlook picnic site. In the Forest Plan, the White Chuck River is a Recommended Recreation River.